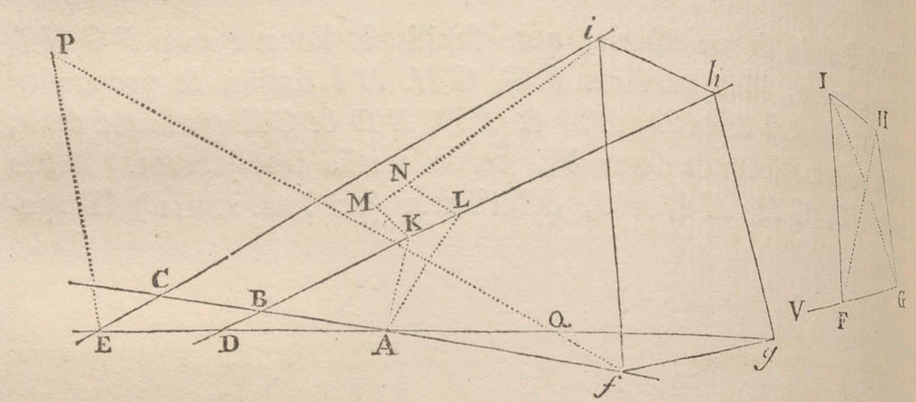
KM, *AL*, *LN* ad eas partes linearum *AD*, *AK*, *AL*, ut literæ *CAKMC*, *ALKA*, *DALND* eodem ordine cum literis *FGHIF* in orbem redeant ; & acta *MN* occurrat rectæ *CE* in *i*. Fac angulum *iEP* æqualem angulo *IGF*, ſitque *PE* ad *Ei* ut *FG* ad *GI* ; & per *P* agatur *PQf*, quæ cum recta *ADE* contineat angulum *PQE* æqualem angulo *FIG*, rectæque *AB* occurrat in *f*, &



jungatur *fi*. Agantur autem *PE* & *PQ* ad eas partes linearum *CE*, *PE*, ut literarum *PEiP* & *PEQP* idem ſit ordo circularis qui literarum *FGHIF*, & ſi ſuper linea *fi* eodem quoque literarum ordine conſtituatur trapezium *fghi* trapezio *FGHI* ſimile, & circumſcribatur trajectoria ſpecie data, ſolvetur problema.

Hactenus de orbibus inveniendis. Supereſt ut motus corporum in orbibus inventis determinemus.

SECTIO VI.

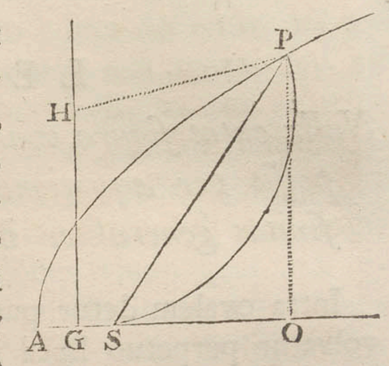
De inventione motuum in orbibus datis.

PROPOSITIO XXX. PROBLEMA XXII.

Corporis in data trajectoria parabolica moti invenire locum ad tempus aſſignatum.

Sit *S* umbilicus & *A* vertex principalis parabolæ, ſitque $4AS \times M$ æquale areæ parabolicæ abſcindendæ *APS*, quæ radio *SP*, vel poſt exceſſum corporis de vertice deſcripta fuit, vel ante appulſum ejus

ad



ad verticem deſcribenda eſt. Innoteſcit quantitas areæ illius abſcindendæ ex tempore ipſi proportionali. Biſeca *AS* in *G*, erigeque perpendiculum *GH* æquale 3 M, & circulus centro *H*, intervallo *HS* deſcriptus ſecabit parabolam in loco quæſito *P*. Nam, demiſſa ad axem perpendiculari *PO* & ducta *PH*, eſt $AGq + GHq$ $(= HPq = \overline{AO - AG}: quad. + \overline{PO - GH}: quad.$ $= AOq + POq - 2GAO - 2GH \times PO + AGq + GHq$. Unde $2GH \times PO (= AOq + POq - 2GAO) = AOq + \frac{3}{4} POq$. Pro *AOq* ſcribe $AO \times \frac{POq}{4AS}$; & applicatis terminis omnibus ad $3PO$ ductiſque in $2AS$, fiet $\frac{4}{3} GH \times AS$ $(= \frac{1}{6} AO \times PO + \frac{1}{2} AS \times PO$ $= \frac{AO + 3AS}{6} \times PO = \frac{4AO - 3SO}{6} \times PO =$ areæ $\overline{APO - SPO})$ $=$ areæ *APS*. Sed *GH* erat 3 M, & inde $\frac{4}{3} GH \times AS$ eſt $4AS \times M$. Ergo area abſciſſa *APS* æqualis eſt abſcindendæ $4AS \times M$. *Q. E. D.*

Corol. 1. Hinc *GH* eſt ad *AS*, ut tempus quo corpus deſcripſit arcum *AP* ad tempus quo corpus deſcripſit arcum inter verticem *A* & perpendiculum ad axem ab umbilico *S* erectum.

Corol. 2. Et circulo *ASP* per corpus motum *P* perpetuo tranſeunte, velocitas puncti *H* eſt ad velocitatem quam corpus habuit in vertice *A* ut 3 ad 8 ; ideoque in ea etiam ratione eſt linea *GH* ad lineam rectam quam corpus tempore motus ſui ab *A* ad *P*, ea cum velocitate quam habuit in vertice *A*, deſcribere poſſet.

Corol. 3. Hinc etiam vice verſa inveniri poteſt tempus quo corpus deſcripſit arcum quemvis aſſignatum *AP*. Junge *AP* & ad medium ejus punctum erige perpendiculum rectæ *GH* occurrens in *H*.

P LEMMA